DESIGN RISK ASSESSMENT (to be developed by Contractors Designer)

PROJECT: REPLACEMENT FIRE ALARM – PHASE 1 **BLOCKS 1 (Part) , 2, 4 & 10** **JOB REF: 4153/17**	**ACTIVITY: HARD WIRED FIRE ALARM REPLACEMENT TO PART OF BLOCK 1 MAIN SCHOOL, SIXTH FORM BLOCKS 2 & 10, BLOCK 4 DT & P.E. AS PHASE 1 REPLACEMENT OF ENTIRE SCHOOL TO CATEGORY L2 OF BS 5839-PART 1:2017.**
EXISTING FIRE ALARM SYSTEM AND LIKELY CATEGORY OF INSTALLATION: **EMS SYSTEM 5000 WIRELESS INSTALLATION TO CATEGORY:** BLOCK 1 - MAIN SCHOOL – L4 (with additional detection in defined risk areas as plan: PCGC/138024/01) BLOCK 2 – SIXTH FORM - L4 (with additional detection in defined risk areas as plan: PCGC/138024/01) BLOCK 10 – SIXTH FORM - L2 (with additional detection in defined risk areas as plan: PCGC/138024/01) BLOCK 4 - DETACHED P.E.-L5 (with additional detection in defined risk areas as DEPT.,DT TECH. plan: PCGC/138024/01) AND GROUNDSMAN **NOTE** SPRINKLER SYSTEMS ARE **NOT** INSTALLED IN ANY OF THE SCHOOL BUILDINGS.	**EXISTING CONSTRUCTION** BLOCK 1 – Concrete block partition walls internally, external concrete block and Reformite cavity walls supporting steel RSJ's on precast concrete columns with timber infill of flat roof and ceiling joists with additional timbers and noggins, cleats etc. supporting original 'Tonkin' deck, replacement plywood, woodwool slab decking, insulation and mineral felt roof covering. The void depth varies and is generally 440 - 580mm with an average of 500mm with suspended ceilings and 150mm fibreglass insulation quilt contained within the void except for classrooms S3,S4 & corridor, DT2, DT3, circulation areas and associated corridors,& some store rooms. The original fibreboard ceilings have been removed except for a section of the corridor outside science classrooms S3 & S4. There is no fire stopping of the open void to tops of partition walls to rooms. A total of 75 No. 1200 x 600 trapezoid polycarbonate roof lights and upvc kerbs are provided throughout the roof of phase 1 with a depth that varies between 1000 to 1400mm to top of roof light. The majority of ceilings are 600 x 600 suspended ceiling tiles throughout. BLOCKS 2 & 10 -Concrete block partition walls internally, external brick and thermalite block cavity walls supporting a precast panel slab first floor with a steel frame and timber infill pitched roof with limited access available over. Suspended 600 x 600 ceiling tiles are provided to all classrooms with an average void depth of approximately 300mm. Plasterboard and skim ceilings are provided to the majority of stores. The common room has a plasterboard ceiling with an artex finish following the pitch of roof. 150mm fibreglass quilt is provided above the first floor ceilings with the quilt to Block 10 suspended on netting with a 300mm average depth void between the top of ceiling tile and underside of quilt. BLOCK 4 - Single block & half brick solid walls supporting a mono pitched roof structure of fibre cement with asbestos cement roofing sheets above machine shop ceiling, plastered ceiling to P.E, suspended ceiling to part Groundsman, exposed fibre cement sheets & steel frame to remainder.

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DESIGN STAGE	HAZARDS IDENTIFIED	PERSONS AT RISK					RISK SCORE TOTAL = SEV X PROB				CONTROL MEASURES BY SCHOOL REPRESENTATIVE	REMAIN RISK SCORE	FINAL DESIGN BY CONTRACTOR'S DESIGNER
		PUPILS	STAFF	VISIT'R	PUBLIC	CONTRACTORS	SEV	PROB	TOTAL				
1.Category level of protection	Risk to life through failure to detect fire, raise or hear alarm to evacuate building(s).	Y	Y	Y	Y	Y	5	3	15		Replacement of EMS Wireless system with a hard wired open protocol analogue addressable Apollo XP95 fire alarm to an L2 category as that provided in Block 10 designed, installed & commissioned in accordance with BS 5839-1:2017 by main contractor. Lift motor/boiler rooms & all stores included due to risk & materials stored.	3	Contractor's BAFE SP201 accredited Designer to undertake full design responsibility for phase 1 from the outline client plans for Phase 1 to BS 5839-1:2017 as Plans: PCGC4153/17/301 PCGC4153/17/302 PCGC4153/17/303
2.Detection and Alarm Zones	Difficulty in location of potential/ actual fire by school staff and Fire Brigade or of a false alarm by school caretaking staff.	Y	Y	Y	Y	Y	4	3	12		Suggested number of loops to repeater and main fire alarm panels, counting devices with more than one function such as smoke/Heat sounders as two devices for the full scheme consisting of three phases: **No. Devices** **PANEL 'A' – Location - Block 1 Reception** Loop 1 – Block 1 - DT, Art & part of Science Classrooms Phase 1 102 Loop 2 - Block 1 –First, second & third floors. Phase 3 – approx. 90 Loop 3 - Block 1 – Ground & basement floors Phase 3 – approx..110 Loop 4 - Block 1 – Phase 3 - Spare - **PANEL 'B' – Location - Block 1 Premises Manager Office** Loop 1 – Block 4 – DT Technician , PE, Grounds (Future new build) - Phase 1 14 Loop 2 - Block 1 – 1972 Extension Phase 2 approx. 110 Loop 3 - Block 1 – 1977 Extension Phase 2 approx. 80 Loop 4 - Block 1 – Phase 3 - Spare - **PANEL 'C' – Location - Block 2 Intake Cupboard** Loop 1 – Block 10 – Complete Block - Phase 1 - 89 Loop 2 – Block 2 - Roof & First Floor - Phase 1- 63 Loop 3 - Block 2 – Ground Floor – Phase 1- 92 Loop 4 - Block 2 – Phase 1 – Spare -	3	Contractor's BAFE SP201 accredited Designer to undertake all loop calculations in conjunction with Contractor Design for addressable devices to allow quick and easy identification to include all preparation of zone plans for each floor/ area as determined by Contractor's final design for Phase 1 of the replacement fire alarm.

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3.Siting of Manual Call Points	Difficulty in location and easy operation of call points in a potential/actual fire situation.	Y	Y	Y	Y	Y	4	3	12		The existing call point locations to be generally followed with the existing conduits for the original hard wired system reused in Block 2 if possible. Call point locations as outline design indicated on Plans: PCGC4153/17/301 PCGC4153/17/302 PCGC4153/17/303 To include the additional call points to reduce travel distances & to areas where no detection or call points previously provided.	2	Contractors BAFE SP201 accredited Designer to undertake full design responsibility to BS 5839-1:2017 & BS EN54-11 as outline design on Plans: PCGC4153/17/301 PCGC4153/17/302 PCGC4153/17/303 to include all design changes necessary for Phase 1.
4.Selection and Siting of Sensors	Selection of sensor devices either not effective or efficient in detecting fires, smoke or leads to an unacceptable level of false alarms affecting the operation of the school and teaching and learning activities.	Y	Y	Y	Y	Y	5	3	15		Selection made with due regard to use of individual areas with optical devices in accordance with BS 5839-1:2017 as outline proposals indicated on plans: PCGC4153/17/301 PCGC4153/17/302 PCGC4153/17/303 Entire system to be LPCB 1014 approved. The 75 No. 1200 x 600mm roof lights to block 1 have a void depth in excess of 800mm but have no separate detection because of the increased risk of false alarms due to the additional number provided, build -up of dust cob webs & resulting high level cleaning issues, effectiveness of 29 No. roof lights in areas with heat detectors, inability to comply with the 500mm recommended clear distance of detector from opposing sides of roof light lining, not being able to site/fix in the top 125mm due to trapezoid shape and depth of polycarbonate triple skin. Roof lights are not acknowledged as lantern lights. Trickle ventilators can be closed if necessary. Detection to be provided within pitched roof spaces of Block 2 and extended to all roof spaces of Block 10.	3	Contractors BAFE SP201 accredited Designer to undertake full design responsibility and decide upon extent of, suitability & siting of devices and if variations on design certificate G.1 of BS 5839-1:2017 is applicable. To include all design changes necessary for Phase 1.

5.Choice and Siting of Alarm Sounders and Visual Alarms	Inappropriate or inadequate number of sounders that can prevent /delay persons being evacuated because alarm could not be heard or seen.	Y	Y	Y	Y	Y	5	3	15		Selection made with due regard to use of individual areas with devices in accordance with BS 5839-1:2017 as outline proposals indicated on plans: PCGC4153/17/301 PCGC4153/17/302 PCGC4153/17/303 Devices to be LPCB 1014 approved.	3	Contractors BAFE SP201 accredited Designer to undertake full design responsibility to BS 5839-1:2017 & to include all design changes necessary.
6.Electronic Door Control	Hold open devices fail to activate with fire alarm and remain open leading to increased rate of fire spread disabling some fire exits.	Y	Y	Y	Y	Y	3	3	9		All existing hard wired hold open devices and large proportion of the existing battery operated doorguard closers in Blocks 2 & 10 to be rewired to new hard wired system. Hold open devices to be compatible with Apollo XP95 fire alarm system and fire panels.	3	Contractors BAFE SP201 accredited Designer to undertake full design responsibility to BS 5839-1:2017 & to include all design changes necessary
7.Void Detection	Fire spreads rapidly through open roof/ceiling/floor voids restricting egress & ultimately increasing the damage sustained to the property.	Y	Y	Y	Y	Y	4	3	12		Blocks 2 & 10 have a floor void depth averaging 300mm approximately with numerous service penetrations between compartment walls. Adequately fire stop all service penetrations/holes and seal small joint between floor slab & internal walls. Pitched roof voids to be provided with fire detection to include means of access through suspended ceiling. Block 1 has blockwork partition walls, timber infill between structural steel beams that support the flat roof deck consisting of the original 'Tonkin' deck, woodwool slabs and plywood sheet replacements, with an open ceiling void with fibreglass insulation quilt to the majority of classrooms. The average 500mm void will be fire stopped above the partition walls with a 60mm mineral and intumescent paper faced board termed 'Promat' cut between timbers & gap filled to seal each room void as detection would not comply due to the close proximity of timbers & insulation quilt, the increased risk of false alarms & difficulty in accessing detectors without disrupting school activities. The roof light voids in excess of	3	Contractors BAFE SP201 accredited Designer to undertake full design responsibility and decide upon extent of, suitability & siting of devices and if variations on design certificate G.1 of BS 5839-1:2017 is applicable. To include all design changes necessary.

											800mm are as detailed in item 4.		
7.Hard wiring Installation	Wiring not adequately secured with metal fixings/clips or where possible secured to non -combustible surfaces to prevent dislodgement in a fire posing a hazard to firefighters or other emergency services.		Y	Y	Y		3	3	9		Installation with non-combustible metal clips or fixings throughout at centres in accordance with cable manufacturer's recommendations & BS 5839-1:2017 guidance to prevent the likelihood of poorly supported cabling restricting or trapping firefighters & ensure safe escape routes within the property.	3	Contractors BAFE SP201 accredited Designer to undertake full design responsibility to BS 5839-1:2017 & to include all design changes necessary.
7.Hard wiring Installation (Continued)	Wiring specification not suitable or installed incorrectly reducing performance of fire alarm system.	Y	Y	Y	Y	Y	4	2	9		Correct specification and installation of standard fire resistant cabling, minimum of 30 minute survival time when tested in accordance with BS EN 50200 for loops & enhanced fire resistant wiring of 120 minutes duration when tested in accordance with BS EN 50200 & BS 8434-2 for interconnecting network cables, adequately supported, metal conduits used where surface run, minimum joints & where necessary adequately labelled. Cables separated/segregated/screened to reduce or induce electromagnetic interference as fire alarm manufacturer's instructions & correctly earthed. All in accordance with BS 5839-1:2017 & IEE current edition.	3	Contractors BAFE SP201 accredited Designer to undertake full design responsibility & contractor the installation and commissioning responsibility to BS 5839-1:2017 & current edition of IEE regulations to include all design changes necessary to include voltage drop calculation and load tests as necessary of the existing electrical supply and it's compatibility with the proposed alarm and detection system.
8.Control Equipment and Power Supplies	Inadequate power or compatibility with proposed fire alarm system causing faults or reduced response to a potential/actual fire.	Y	Y	Y	Y	Y	5	3	15		All 4 loop Fire Alarm Control Panels compatible with an Apollo XP95 System with visual display sited on ground floor with minimal risk of tampering or vandalism to reduce risk of false alarms. Main Fire Alarm Panel is situated for easy access to Fire Brigade. Electrical distribution boards within reasonable access all as indicated on outline plans. Separate connection via an isolation switch & not RCD board to be provided.Battery backup to be provided sufficient to maintain system for a 24 hour period. External Alarm Monitoring Station to inform recipients on a designated key holder list as existing arrangements. All electrical work to be undertaken by	3	Contractors BAFE SP201 accredited Designer to undertake full design responsibility & contractor the installation and commissioning responsibility to BS 5839-1:2017 & current edition of IEE regulations to include all design changes necessary to include voltage drop calculation and load tests as necessary of the existing electrical supply and it's compatibility with the proposed alarm and detection system. The contractor is to carry out a thorough inspection of

											an NICEIC approved contractor able to provide a completion certificate.		the electrical installation to determine suitability.
9.Testing of Completed Installation Equipment and Power Supplies. (Soak period)	Failure of maintaining existing EMS Wireless System 5000 during installation, soak period and the time between completion of Phase 1 and the remaining two phases, causing reduction in efficiency.	Y	Y	Y	Y	Y	4	3	12		Maintain wireless system throughout Phase 1 installation & interconnect systems upon successful completion of a **3 week soak period,** where no false alarms from hard wired system are recorded. Repeat soak period if false alarm(s) occur, temporarily blank manual call points & do not connect new system to external alarm receiving station, until successful soak period.	3	Contractor to sign all relevant certification comprising Design, Installation, Commissioning certificates. The Acceptance & Verification certificates will be signed by the school's representative Aston Reef.

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BLOCKS 1 (Part) , 2, 4 & 10

JOB REF: 4153/17

ACTIVITY: HARD WIRED FIRE ALARM REPLACEMENT TO PART OF BLOCK 1 MAIN SCHOOL, SIXTH FORM BLOCKS 2 & 10, BLOCK 4 DT & P.E. AS PHASE 1 REPLACEMENT OF ENTIRE SCHOOL TO CATEGORY L2 OF BS 5839-PART 1:2017, INCLUDING FIRE STOPPING WITHIN FLOOR AND ROOF VOIDS.

WORK ELEMENTS	HAZARDS IDENTIFIED	PERSONS AT RISK					RISK SCORE TOTAL = SEV X PROB			ENVIRON DAMAGE RISK	CONTROL MEASURES BY DESIGNER	REMAIN RISK SCORE	ACTION BY CONTRACTOR
		CON	OPS	MAN	PUB	VIS	SEV	PROB	TOTAL				
Working at Height	Falls, Access to roof & floor void areas.	Y	Y	Y			4	3	12	L	Ensure that RAMS provided by contractor through development of contractors Heath and Safety construction Phase Plan as part of the CDM responsibilities.	3	Develop item raised in the CDM Pre-contract Health & Safety Plan Erect. Provide advice to school on dangers of construction site. Safe means of access provided. Trained staff to erect towers.
Hot Works	Outbreak of Fire mainly through use of angle grinders or similar heat & spark creating power tools.	Y	Y	Y	Y	Y	5	3	15	M	Hot work permit system to be followed by contractor. Adequate insurance held by contractor and separate insurance taken out by school. Insurer notified.	3	Follow Hot Work Permit system with firesafe times followed. Ensure required level of insurance cover.
Use of angle grinders/drills & power tools in general including disc fragments, any toxic vapour release and injury.	Dust, Fumes, Fire, Manual Handling Issues, Vapour release and disc fragments and resultant injuries.		Y			Y	5	3	15	M	Ditto for risk of hot works. Remainder raised as risks to be managed by the contractor in the Pre-Construction Information Document.	3	Inform operatives of danger. Follow Hot Work Permit System of Work. RAMS in Construction Phase Plan in place prior to commencement. Ensure correct PPE supplied and worn by operatives.
Proximity of ACM's (Asbestos Containg Materials).	Asbestos	Y	Y	Y	Y	Y	5	3	15	L	Asbestos Survey completed and asbestos analysis and locations identified where applicable. Refer & sign Asbestos Register.	3	Refer to asbestos surveys and sample analysis contained within Pre-construction Information Document. Sign Register.

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		CON	OPS	MAN	PUB	VIS	SEV	PROB	TOTAL				
Security of Premises	Possible unauthorised entry and resultant theft or vandalism				Y	Y	4	1	4	L	Included and raised as a risk to be managed by contractor in Pre- Construction Information Document. Utilise School CCTV,	2	Inform contractor of danger. Contractor to ensure adequate signage and fencing around access and work areas.
Electrical Disconnections and subsequent reconnections and connection to and alterations of power and distribution boards..	Electrocution	Y	Y				5	2	10	L	Specify disconnection/ reconnections by NICEIC Contractor.	3	Employ NICEIC contractor who is able to supply the appropriate completion certificate.
Access to Contractors Work area and around site externally and internally.	Interaction between Contractor and School Students and Staff and members of the public.	Y	Y	Y	Y	Y	4	3	12	L	Barrier off around work areas including any scaffold and compound/ storage areas. Restrict time of work to certain agreed operations where disconnections applicable.	4	Agree with school a programme of work. Restrict deliveries to safe periods. RAMS in Construction Phase Plan in place prior to commencement.
Safe access and egress in and around school by staff, students and visitors.	Falling materials, fire escape exits, danger of slips trips & falls throughout works.	Y	Y	Y	Y	Y	5	2	10	L	Included and raised as a risk to be managed by the contractor in the Pre-Construction Information Document. Ensure majority of work undertaken during holiday periods.	3	Liaise with school over areas to be worked upon and provide a programme of work to be agreed. Supply and install bollards/fencing, adequate signage to work areas.
Man Handling of Materials & Plant	Muscular and skeletal Injuries sustained through lifting.	Y	Y	Y			3	3	9	L	Design so that materials, doors used are as light as possible. Minimise use of heavy plant.	3	Inform operatives of danger. Ensure manhandling is kept to the minimum necessary and produce adequate RAMS.

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		CON	OPS	MAN	PUB	VIS	SEV	PROB	TOTAL				
Scaffolding and Safe means of Access	Injuries caused by standards or tower scaffold including collapse &walking into.	Y	Y	Y	Y	Y	3	3	9	L	Indicate allowance for protection and highlight risk in the Pre- Construction Information Document	3	RAMS in Construction Phase Plan in place prior to commencement. Reduce access by provision of suitable barrier and warning notices..
Fibreglass quilt insulation within roof voids & above ceilings while undertaking fire stopping and installation of fire alarm wiring.	Fibre release if disturbed.	Y	Y				3	3	9	L	Included and raised as a risk to be managed by the contractor in the Pre-Construction Information Document	3	RAMS in Construction Phase Plan in place prior to commencement. Ensure correct PPE supplied and worn by operatives. Minimise disturbance to absolute minimum
Cutting of mineral wool fire bat between timbers above partition walls to block 1 and in service penetrations to blocks 2 & 10.	Fibre release when cutting and installing. Release of fumes by intumescent sealants within restricted voids.	Y	Y				3	4	12	L	Included and raised as a risk to be managed by the contractor in the Pre-Construction Information Document	3	RAMS in Construction Phase Plan in place prior to commencement. Ensure correct PPE supplied and worn by operatives. Minimise disturbance to absolute minimum

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